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RECONSTRUCTION METHOD OF OIL CARRIERS

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RECONSTRUCTION METHOD OF OIL CARRIERS

[Oil carrier no kaizo hoho]

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Claim

A reconstruction method of oil carriers for reconstructing an oil carrier into a bulk carrier, for example, by changing an oil tank with a single bottom structure and sectioned by longitudinal partition walls into a loading and unloading storage facility, etc. with a characteristic in which the upper deck that sections the upper part of the aforementioned oil tank is cut off and a storage opening is formed, aforementioned longitudinal partition walls are cut and separated to form cut remaining parts at a specific height with respect to upper deck side and with respect to the single bottom structure side, the aforementioned upper deck piece that is cut off is mounted and connected over cut remaining parts that remain over the aforementioned single bottom structure and a double bottom is formed, one end of an aforementioned longitudinal partition wall that has

been cut and separated is connected to the remaining lower face of the aforementioned upper deck that has been cut remaining and the other end drops vertically, an inclined partition wall is included between the end that drops vertically and the double bottom, they are connected together and changed into a loading and unloading storage compartment.

Detailed explanation of the invention

This invention concerns a reconstruction method of an oil carrier for changing an oil tank of an oil carrier into a loading and unloading storage facility, for example, and remodeling it into a bulk carrier, for example. It in particular concerns the reconstruction method of an oil carrier, in which the structural parts that construct an existing oil carrier can be effectively utilized, and the amount of steel material that is additionally required will be reduced at reconstruction, and in which work can be simplified, and in which a sufficient loading and unloading volume after the remodeling can also be assured.

An oil carrier generally uses a Longy [transliteration] style in a single bottom structure (1), as shown in Figure 1A. The inside of a ship hull (4) is sectioned by longitudinal partition walls (2)··· that are provided in the direction of the length of the ship and lateral partition walls (3) ···that are provided in the direction of the width of the ship, and many oil tanks (5)··· are formed. On the other hand, a bulk tank (an ore carrier is shown as one example) closely resembles an oil carrier, as shown in Figure 1B. It has a double bottom structure (7) to prevent scratching of the outer plate of the ship bottom (6) particularly when loading and unloading cargo and for storing fuels, etc. It also has a storage opening (8). Like an oil carrier, it sections the inside of the ship hull (4) by longitudinal partition walls (2)··· and lateral partition walls (3)··· and forms many loading and unloading storage compartments (11)··· including ballast tanks (9)··· and a fuel tank (10), etc.

Accompanying the soaring price of crude oil in recent years, an increase in the demands for coal and oil shale, etc. as substitution fuels is anticipated for the future. Accordingly, a rapid increase in remodeling of a large number of oil carriers into coal transporting bulk carriers (ore carriers), etc. has been considered, and a remodeling construction at low cost as well as rapid speed is requested.

Figure 2 shows the structure of a ship hull conventionally remodeled by this type of reconstruction method of oil carriers.

Figure 2C shows a typical bulk carrier, which can load not only ores, such as coal, for example, but also grain, and it requires an almost complete remodeling construction inside except for the hull of the ship (4). More precisely, the structure that surrounds a loading and unloading storage compartment (11) must be changed mainly to beam materials and frame materials, for example, by eliminating longitudinal partition walls. Top side tanks (12)···, for

example, must be additionally formed at the upper part of the ship on the other hand. Furthermore, the structure that allows to passing of a three-dimensional structure that includes inclined plates (12a) that form the inclined sides of the top side tanks (12)··· through the lateral partition walls (3) becomes very complicated, and its construction is bothersome. Also, the cost and the number of construction processes that are required for the illustrated remodeling is large together with the problems of the amount of steel material that is necessary for the additionally provided structure, the arrangement work, and the complicated construction described above.

Figure 2D shows a very simplified structure, in which the upper deck (13) is simply cut off and a storage opening (8) is formed, the inner bottom plate (14) which forms the double bottom structure (7) is connected to the longitudinal partition walls (2)··· and the lateral partition walls (3) at the bottom part of the oil tank (5). However, the capacity that can be provided to the loading and unloading storage compartment (11) is very small, and only a very small load in a relatively small specific gravity besides ore can be loaded as compared to the number of tons of the loading weight of the ship.

Figure 2E shows a type, in which the longitudinal partition walls (2)··· are cut off while leaving a length for the depth of the double bottom structure (7), and the inner bottom plate (14) is enlarged and formed to extend between the outer plates of the ship (15)···. However, the strength of the ship is of concern because there are no longitudinal partition walls, and there also is an issue concerning unloading loads readily deposited over many longitudinal parts (16)··· at the side of the outer plates of the ship (15)··· previously provided in the oil carrier, and it is difficult to obtain a smooth loading activity.

This invention was created while considering the problems in the conventional reconstruction methods of oil carriers described above and for effectively solving them.

The objective of this invention is to offer a reconstruction method of oil carriers for changing an oil tank in an oil carrier into a loading and unloading storage compartment, for example, and remodeling it into a bulk carrier, for example, in which the structural parts of existing oil carriers can be effectively utilized so that the amount of steel material that is additionally required will be reduced, and so that work can be simplified, and a sufficient volume of loading and unloading storage capacity after remodeling can also be assured.

One satisfactory embodiment example of the reconstruction method of oil carriers in this invention will be described in detail in accordance with figures attached below.

As shown in Figure 3F, the ship hull (4) of an oil carrier has a single bottom structure (1), and an oil tank (5) is sectioned and formed by longitudinal partition walls (2)··· that hold the longitudinal and lateral strength and the lateral partition walls (3) that cross them inside the ship hull (4). At the remodeling, as shown in Figure 3G, the upper deck (13) which sections the upper part of the oil tank (5) is first cut into a specific shape, and an opening part (17), which later

becomes a storage opening, is formed. The upper deck piece (18), which is cut and separated, is lowered to the bottom part of the oil tank (5). During this, a reinforcing member, such as a floor, for example, which is necessary for the formation of the double bottom structure (7), is pre-added to the upper deck piece (18). At the same time, a lower end part of the longitudinal partition walls (2)··· is cut and separated from the outer plate of the bottom of the ship (6) while forming cut remaining parts (2a)··· at the height corresponding to the depth of the double bottom structure (7) from the side of the single bottom structure (1). The aforementioned upper deck piece (18) is then laid across the cut remaining parts (2a)··· of the remaining longitudinal partition walls (2)··· that have been cut remaining over the double bottom structure (7), is mounted and connected, and a double bottom is formed with the inner bottom plate (14).

Next, as shown in Figure 3H, the upper end part of the longitudinal partition walls (2)··· that are vertically suspended from the lower face of the upper deck (13) with their bottom parts cut and separated is cut and separated from the upper deck (13) while forming cut remaining parts (2b)··· at a specific height to be utilized as a beam plate below the upper deck from its upper deck (13) side. For the longitudinal partition walls (2)··· wherein a relatively low height of the upper end part and the lower end part are cut off in this manner are moved towards the outer direction of the width of the ship in a manner sandwiching the double bottom structure (7) that has been newly provided, their one end is connected to the lower face of the upper deck (13) that has been cut and separated, and the other end is vertically suspended. During this, by forming an inside structure, such as ballast tanks (9)···, for example, that are formed surrounding the loading and unloading storage compartment (11) beforehand at the side of the outer plate (15)··· of the ship, sectioning of the ballast tanks (9)···, for example, can be formed at the same time when moving the longitudinal partition walls (2)···, and a double structure of the ship can be formed by connecting them together.

Finally, as shown in Figure 3J and Figure 4, inclined partition walls (19)··· are laid across between the lower end parts of the newly added longitudinal partition walls (2)··· that are separated from each other and the peripheral edge area of the inside bottom plate (14) as the second bottom so that loads that will be unloaded do not remain in corners of the loading and unloading storage compartment (11) but drop towards the inside bottom plate (14) for convenience in cargo handling, and they are connected together. A storage opening (8) is formed by providing hatch combing, etc. at the opening part (17) of the aforementioned upper deck (13). As shown in Figure 5, a deck between storage openings (20) may also be provided at the opening part (17), and 2 storage openings (8) may be formed. On the other hand, although not shown in the diagram, inclined partition walls can also be included between a lateral partition wall and the inside bottom plate to attain convenience in cargo handling.

In this manner, the oil tank (5) of an oil carrier is changed into a loading and unloading storage compartment (11) that has a double bottom structure (7) in its bottom part and a storage opening (8) above, and its peripheral side area is sectioned by the lateral partition wall (3) and longitudinal partition walls (2)···, and equipped with the inclined partition walls (19)···, and it is remodeled into a bulk carrier, etc. Furthermore, ballast tanks (9)···, for example, for gaining speed when the ship is empty are also equipped at the outside of the loading and unloading storage compartment (11).

As shown in Figure 4, in the reconstruction method of oil carriers in this invention, the inside bottom plate (14) in the double bottom structure (7) and the longitudinal partition walls (2)··· that section the majority part of the outer hull of the loading and unloading storage compartment (11) that is remodeled and newly installed are the upper deck structure (13) and the longitudinal partition wall structure (2) in rigid construction that were already installed and were just moved, and can be effectively utilized while contributing to the longitudinal strength of the body of the ship. The steel materials that are additionally necessary can be minimized to frame materials, such as inclined partition walls (19)··· and the floor, etc. that are relatively small. The amount of steel material that is required can be reduced to a minimum, and a reduction in cost can be attained.

A loading and unloading storage compartment (11) with a large capacity can be formed while establishing the necessary capacities of the ballast tanks (9)···, for example, by just moving the existing longitudinal partition walls (2)···in the direction of the width of the ship, and a sufficient number of tons in the loading weight can be obtained, and a sufficient strength of the body of the ship can also be assured. On the other hand, the capacity ratio between the ballast tanks (9)··· and the loading and unloading storage compartment (11) can be changed by the amount of movement of the longitudinal partition walls (2)···, and this can be established at the time of the remodeling according to the specific gravity of the items that will be loaded.

Furthermore, it is not necessary to pass a conventional three-dimensional structure that uses inclined plates (top side tank) as indicated in Figure 2C through the lateral partition wall (3) in the remodeling work. It is sufficient to just pass the longitudinal partition walls (2)··· in a simple plate structure through the lateral partition wall (3), which eliminates complicated work and allows for a very easy construction where remodeling can be accomplished in a short period of time.

Furthermore, the ship has a double structure equipped with the ballast tanks (9)···. As a result, lateral projecting parts, such as longitudinal members, for example, do not remain inside the loading and unloading storage compartment (11) as shown in a conventional example in Figure 2E, which allows for smooth cargo handling.

Figure 6 shows a modified embodiment example of the reconstruction method of oil carriers in this invention. That abbreviated process will be explained. As shown in Figure 6K and L, the upper deck (13) which sections the upper part of the oil tank (5) is first cut into a specific shape, the longitudinal partition walls (2)··· are cut and separated from the upper deck (13) while forming a cut remaining part (2b) at a height that corresponds to the depth of the double bottom structure (7) at the lower face of the upper deck (13), and an opening part (17) which later becomes a storage opening is formed. Then, the upper deck piece (18) that is cut and separated is moved towards the outer direction of the ship hull (4).

Next, as shown in Figure 6M, the longitudinal partition walls (2)··· that are vertically provided from the outer plate of the ship bottom (6) are separated from it. During this, the lower end part of the longitudinal partition walls (2)··· may be cut remaining at the side of the outer plate of the ship bottom (6) and formed as cut remaining part (2a). The longitudinal partition walls (2)···, which are cut off at relatively low heights, are moved towards the outer side in the direction of the width of the ship, one end is connected to the lower face of the upper deck (13) that remains, and the other end is vertically suspended. The longitudinal partition wall (2) in the center can be used for the frame material for an inclined partition wall (19), which will be described later, and for other items including a girder, for example. During this, a double bottom structure (7) is pre-formed over the single bottom structure (1) in the bottom part of the oil tank (5), and an inside structure, such as ballast tanks (9)···, for example, is formed at the side of the outer plates of the ship (15). The aforementioned upper deck piece (18) is then mounted over the double bottom structure (7), this and the cut remaining part (2b) of the longitudinal partition wall (2) are supported over the single bottom structure (1) and connected, and a double bottom is formed.

Finally, as shown in Figure 6N, inclined partition walls (19) are installed across the lower end part of the new longitudinal partition walls (2)··· that are separated from each other and the peripheral edge areas of the inside bottom plate (14), which is the second bottom, and they are connected to each other.

The same effect as in the aforementioned embodiment example is certainly also displayed in this modified embodiment example.

To summarize the above, this invention displays the excellent effects below.

(1) The inside bottom plate in the double bottom structure and the longitudinal partition walls that section the majority of the outer hull of the loading and unloading storage compartment that is remodeled and newly installed can be formed by just moving the upper deck structure and the longitudinal partition wall structure in rigid constructions that are already installed. They can be effectively utilized while contributing to the longitudinal strength of the body of the ship, and steel materials that are additionally necessary can be minimized to

relatively small frame materials, for example, which reduces the amount of steel material that is necessary to a minimum and attains a reduction in the cost.

(2) A loading and unloading storage compartment of large capacity can be formed while establishing the necessary capacity of ballast tanks, for example, by just moving the longitudinal partition walls that already exist simply in the direction of the side of the ship, and a sufficient number of tons in the loading weight can be obtained, and a sufficient strength of the body of the ship can also be assured.

(3) The remodeling work does not require passage of a three-dimensional structure, such as a top side tank, for example, through the lateral partition wall in particular, and passage of longitudinal partition walls in a simple plate structure is enough, which eliminates complicated work, allows for a very easy construction and the attainment of remodeling in a short period of time.

(4) A double structure equipped with ballast tanks is used, for example. Therefore, lateral projecting parts, such as longitudinal members, for example, do not remain in the loading and unloading storage, and this allows for smooth cargo handling.

Brief description of the figures

Figure 1 shows lateral cross-sectional diagrams of a typical oil carrier and ore carrier. Figure 2 shows lateral cross-sectional diagrams of a ship hull in a conventional reconstruction method of oil carriers. Figure 3 shows processes indicating the reconstruction method of an oil carrier in this invention. Figures 4 and 5 show lateral cross-sectional diagrams of ship hulls after remodeling. Figure 6 shows processes indicating a modified example of the reconstruction method of oil carriers in this invention.

In the figures, 1 is a single bottom structure, 2 is a longitudinal partition wall, 2a and 2b are cut remaining parts, 5 is an oil tank, 8 is a storage opening, 11 is a loading and unloading storage compartment, 13 is an upper deck, 14 is an inside bottom plate which is a second bottom, 18 is an upper deck piece, and 19 is an inclined partition wall.

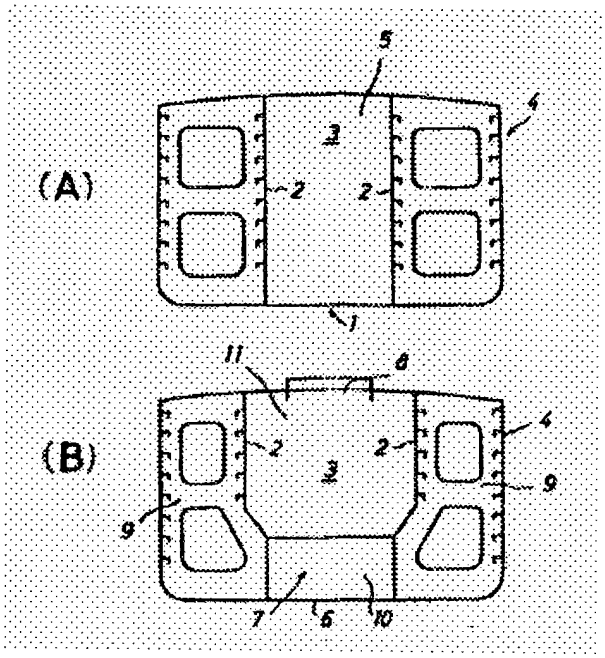

Figure 1

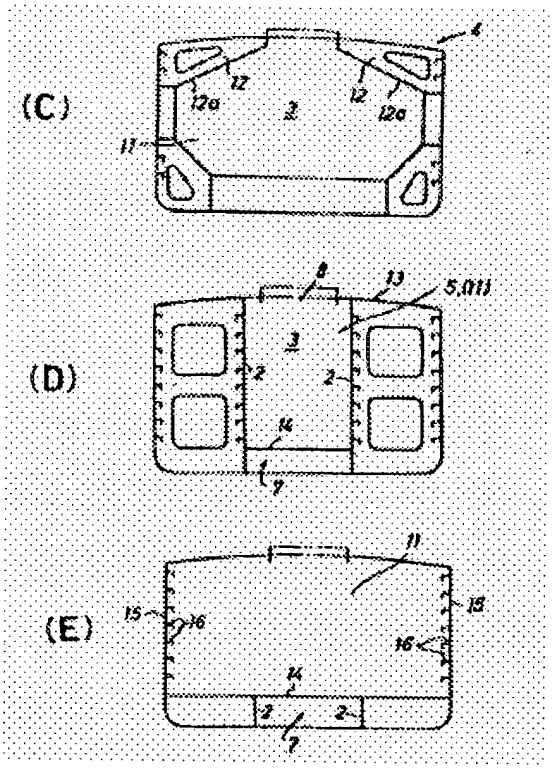

Figure 2

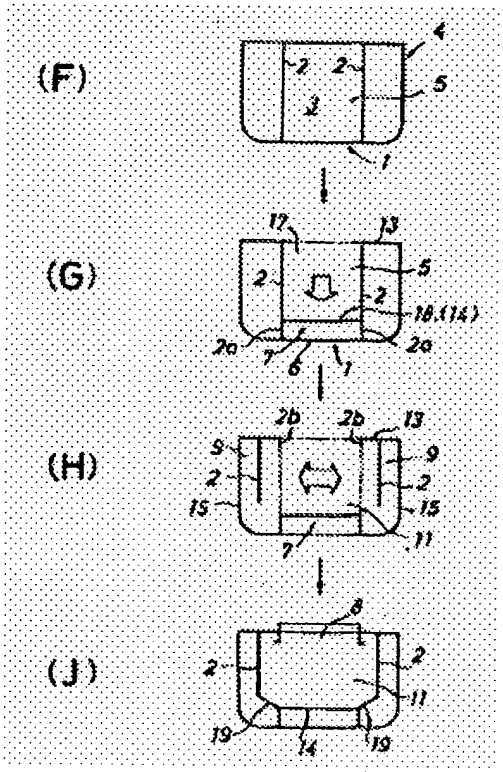

Figure 3

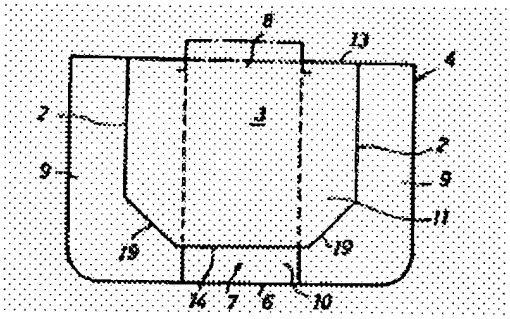

Figure 4

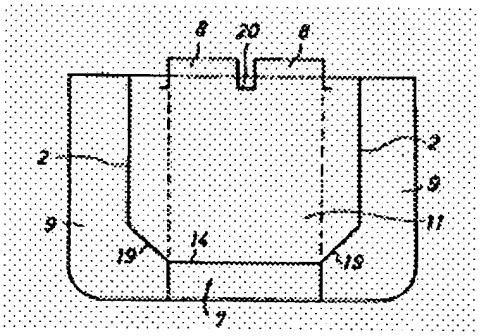

Figure 5

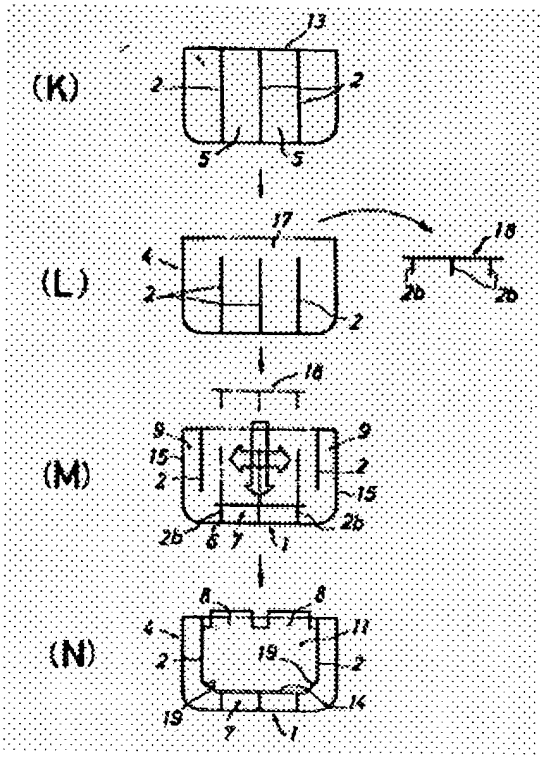

Figure 6